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PSYCHOLOGY AND SCIENTIFIC METHODS

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THE JOURNAL OF PHILOSOPHY
PSYCHOLOGY AND SCIENTIFIC METHODS

DUALISM IN ANIMAL PSYCHOLOGY[1]

THE second edition of Professor Washburn's text-book in animal psychology indulges as little as the first in controversy over matters of general theory. Indeed the chief purpose for which the book was written (as the author stated in the Introduction to the first edition) was to bring together, and make available for the ordinary student, the simple facts whose discovery is the result of experimental method in comparative psychology. And it is the rapid accumulation of such facts discovered since the first appearance of *The Animal Mind* in 1908, that has led the author to prepare a second edition, a task which involved the rewriting of more than half of the earlier volume. Of the growth of theoretical controversy which has accompanied this rapid advance in comparative psychology during this decade, little intimation appears in the text. Text-books are not, of course, the place to discuss such subjects. Yet the reader who peruses the pages of *The Animal Mind* with the issues of current controversy in the back of his head may well find food for philosophical reflection. For the interesting facts of animal behavior which the author sets before us in so orderly and clear a manner are not, after all, presented merely as interesting facts. They are selected and ordered that they may serve as evidence from which the animal mind—or minds—may be *deduced*. As the author herself remarks in the Introduction, the book might properly be entitled *The Animal Mind as Deduced from Experimental Evidence*. It is the conception of the object of psychology, implied in this title and explicitly laid down in the opening chapters, which gives pause to the theoretically-minded reader.

The conception is a familiar one. The only mind which the psychologist, or any individual, can know is his own mind; and this he knows directly and immediately. The only way in which the psychologist can learn to know the mind of another conscious being is to ask himself how he would feel and think in the other's place.

[1] M. F. Washburn, *The Animal Mind*, second edition, revised. New York: The Macmillan Company, 1917.

Just in so far as he is able to answer this question, can he gain any insight into the other's mind. It evidently follows that each of us can know the conscious processes of others only in so far as they are like our own. In so far as they differ from our own they must remain a sealed book to us. Furthermore, the feelings and thoughts of others to be understood must not only *be* like our own; they must also express themselves in similar words or acts. It is a fundamental postulate of all psychology, human and animal, that like behavior is evidence of like conscious processes. There are thus great difficulties lying in the path of the comparative psychologist. He may perhaps hope to reconstruct imaginatively the feelings of the questing dog or the racing horse; but to put himself in the place of the buzzing wasp or the wriggling worm is beyond his powers. Nevertheless, precarious and devious as the path of the comparative psychologist must be, it is the only way open, and some progress is possible, and has, indeed, already been made.

Thus, according to this conception, two distinct but equally important tasks confront the investigator of the animal mind: first, the discovery and description of the facts of animal behavior; second, the psychological interpretation of those facts. In order successfully to accomplish the first, training is necessary to distinguish the simple facts from the interpretation of them—what is actually seen from what is merely inferred. But since what can be observed is only external behavior, *i. e.*, physical movements, the peculiar task of the psychologist, as distinct from the biologist, remains to be performed: the inference as to what conscious processes, if any, accompany these acts.

The frank and clear-cut statement of this familiar position which is given in the opening chapters raises squarely a number of fundamental problems. What is the aim of psychological science? Is the goal of the psychologist the imaginative reconstruction of the experience of the conscious being he is studying? Surely not, since the pursuit of science is essentially a social enterprise, and the body of facts and theories constituting a science is a common object. Psychology, in so far as it is a science, we should all agree, consists in the *description* of the facts concerning minds, and the *statement* of the systematic interconnection of these facts.

What Professor Washburn and others of her school evidently mean to claim is that it is only in so far as we can imagine the sensations and feelings of another that we are prepared to give a psychological account of them, or understand the account given by any one else. Now this claim, while it is so plausible that to question it may seem mere perversity, I find great difficulty in admitting. For one thing, it carries with it the acceptance of a whole body of

logical doctrine to which there are grave objections. This is too large a subject to enter upon here. Viewed more directly and empirically, the claim raises equally serious doubts. The old objection, that, if our knowledge of the sensations and emotions of animals depended on the possibility of translating them into terms of our sensations and emotions, no psychology of the lower animals would be possible, seems to me unanswerable. That after so staggering a presentation of the difficulties of comparative psychology as our author gives us in the first chapter she can yet believe in the fruitfulness of the enterprise, is an arresting observation. One is compelled to ask whether the enterprise be, after all, the sort of intellectual adventure it is pictured as being.

Let us examine it a little more closely. When I see my dog running along the walk with his nose to the ground, and I know one of the children went that way to school a half-hour ago, I describe his experience as an attentive discrimination of the odor of the child with a feeling tone of pleasurable excitement. This is a description which has an intelligible and fairly definite meaning to any one of us. And yet no one of us ever had such a total experience nor even, perhaps, experienced a single one of the essential elements entering into it. The individual human being has for us no distinctive odor when he is clean, whereas we know that for the dog each person of his acquaintance has an unmistakable odor, and that the characteristic odor of his master is highly agreeable in a peculiar way. To me, as I suppose to most of us, the idea of a distinctive odor attaching to a person is unpleasant. Even if this were not so, I could not imagine an odor having the peculiar emotional coloring which the odor of his master has for the dog—which leads him, for example, to find solace and contentment in lying on an old glove or other article of clothing. It is true I have had various experiences of pleasurable excitement attaching to odors. The smoke of a locomotive always had a peculiarly delightful exciting quality; but it does not seem to me that my understanding of the experience of the dog who follows the child so eagerly is brought about by calling up this pleasurable excitement and translating the dog's experience in terms of that. It even seems to me very improbable that the description of the dog's experience would be unintelligible to me even though some accident had deprived me in youth of all sense of smell. Is Helen Keller debarred from entering into an intelligent discussion as to whether the white rat has color-vision, because she can not imagine red and blue? That her blindness would entail serious disadvantages to her psychological study of vision is undoubtedly true; but that it would make the psychology of vision unintelligible to her is not credible.

The crucial question is: What do such psychological terms as red

and anger and unpleasantness and space-perception *mean?* Does each denote a "this," an incommunicable bit of private experience, which each one of us identifies to himself by calling it up in imagination? If so, how can we manage to be mutually comprehensible? Perhaps our author would answer that while I do denote such a "this" by red or anger, I may enable you to identify a similar "this" by describing it in terms of the external relations it bears to stimulus on the one hand and response on the other, just as a description may be used to indicate the denotation of any proper name. What red or anger *denotes* is a bit of private feeling, and it is this that the psychologist studies. To this contention the reply is that such a merely private and incommunicable somewhat can not become the object of scientific investigation. And if this reply seem a piece of *a priori* dogmatism, we may point to the empirical facts themselves.

The psychological uniformities holding of sensation-qualities of color, such as the laws of color-contrast, relation of brightness and saturation, *etc.*, are all *formulations of uniformities of discriminative responses to objectively standardized conditions.* Does the psychologist wish to determine the complementary of a certain shade of red? He selects a piece of colored paper of a standard make and grade, gives it a determinate illumination, places a normal observer in a standard relation to it, *etc., etc.* In short, what he is studying is no "this;" it is the standard paper in a certain complex set of relations to the observer. The importance and the significance of the introduction of experimental method in psychology lies precisely in the fact that it provides a means for the determination of psychological phenomena. *The phenomena thus investigated become in effect functions of the factors constituting the standardized conditions of the experiment.* It must not be suggested, however, that this means the identification of psychological research with either physical or biological science. The psychological standardization of the conditions of experiment is almost never equivalent to a physical or mechanical standardization of them. What may constitute a wide variation in conditions mechanically considered, may well fall within the limits of psychological constancy for the particular experiment in hand. Nor is this determined by an unchecked introspection that a given variation does not "look" or "feel" different, but by further experiments which act as mutual checks.[2]

[2] For example, an illumination may be psychologically constant, even though there be mechanically measurable variation. But a mechanical variation which is too slight to be directly discriminated may nevertheless count as a psychological variation. If it should be found that such a change in degree of illumination was followed by a constant variation in the results of observations of mini-

In short, one of the most important tasks of the psychologist is the determination of what constitutes the standardization in typical cases.

What has just been said refers primarily, of course, to the investigation of sensation-qualities, which is one of the fields where experiment has proved most fruitful. But it is not less true that other psychological terms such as those mentioned above—anger, unpleasantness, space-perception—denote phenomena which can be determined only by the relations which they bear to stimulus and response. What the psychologist actually means by anger, for example, is an emotional attitude which manifests itself in a certain characteristic mode, or rather modes, of behavior. It is often asserted that anger is first known as a peculiar inner state by each individual, which is later ejectively attributed to others as a result of inference from behavior. Now as a genetic account of the empirical origin of our idea of anger, this seems to me to be on a par with the explanation of simple spatial ideas as due to inferences made in early childhood from differences in sense-data. The child surely perceives his nurse's anger as immediately as he does her position between the chair and the table—nay, even more directly, since he instinctively responds to her loud threatening tones and her scowling face, while he must learn by experience what modifications of response the position between chair and table call for. But neither the perception of anger nor that of position is the result of *inference,* but of something much simpler and more direct. Later on, when anger is discriminated by name, it is as likely to denote the attitude Daddy will have if one is naughty, as one's own feelings when one throws a toy across the room or slaps sister.

It is an experience which all of us must sometime have had, to be suddenly accused of being angry in the midst of eager discussion. After the first tendency toward indignant denial, we may, perhaps, recognize the justice of the accusation. Now on what is such recognition based? Is it not largely because we catch the echo of our own raised voice, or become aware of our menacing attitude toward our companion? Sometimes, indeed, we may be frankly doubtful whether we were angry or not, if there be no manifest evidences of it. It is, of course, very difficult to make a reliable introspection; one is inevitably prejudiced. But it seems clear to me that what we mean by "being angry" is not the enjoyment of a subjectively identifiable mental process. No psychologist, I venture to assert, ever discriminated such a process and mentally labelled it "anger"

mal changes in grays, or that the rate of eye fatigue varied with the change in illumination, such change would be classed as truly psychological.

for purposes of scientific reference and comparison. Suppose he had done so, and tried to classify later experiences as "anger" or "not-anger" by comparison with this. He would find himself in serious perplexity, first, because it is very difficult to recall a past emotional state for purposes of comparison; and second, because he would probably find himself using the term in an arbitrary way, and making statements which could not be verified by others. As a matter of fact "being angry" seems to cover a somewhat indefinite range of feeling. Cold, still anger is a somewhat different feeling from hot, passionate anger; nor does it seem probable that a psychologist continues to classify them as varieties of a common species because of any identical element in the two experiences. What psychology has done, indeed, just as what every science must do, is to take over classifications and distinctions from common sense and gradually to reconstruct and systematize them. In the case of the emotions, psychology has as yet made but slight progress. Anger and fear as used by psychologists are practically common-sense terms. They can be made scientific, *i. e.*, be given that definiteness of denotation and connotation which science demands, only as they are formulated as determinate functions of behavior.

If the foregoing contention is just as regards emotion, it is more evidently so as regards such a phenomenon as space-perception. Space-perception, unlike red or anger, is no particular conscious experience. Rather it designates a class under which practically all our sensory experiences fall. It can not be said of space-perception, as it is said of a sensation-quality or an emotion, that it is something we first become acquainted with in our own experience and then attribute to others. In one sense of that much-abused term "acquaintance" I am indeed acquainted with space-perception, since my experience includes or involves it; but this sort of acquaintance does not take me very far toward my goal of scientific identification and description. Just what are the specific differentiæ of space-perception? The attempts to answer this question constitute a long chapter in psychological controversy. Professor Washburn judiciously speaks of it as "involving the simultaneous awareness of a number of sensations consciously referred to different points in space." But what is a conscious reference to different points in space? It must include the experience of the two-year-old child who persistently tries to put the largest block of his nest of blocks into the smallest, and the experience of the skillful dressmaker, who after a brief inspection of an illustration of a complicated garment cuts a pattern for it offhand. "Conscious reference," or "localization," would seem to stand in need of further analysis before it can be made the basis of definite and hence fruitful inquiry regarding the

experience of the sea-urchin or the stickleback. That a scientific study of different levels or types of space-perception and of their relationship to each other can be made without constant dependence on standardization in terms of stimulus and response does not seem possible. Space-perception is not an inner mental state whose relations to behavior are merely external. On the contrary, psychology is forced to treat the relationship to response as constitutive and determinative of the phenomena it studies.

At this point it seems well worth while to raise the following question: How different in actual procedure and in results is a study of animal mind and behavior carried out from the standpoint of such a dualism as our author's, from a similar study made by a behaviorist?

The bulk of *The Animal Mind* is taken up with an investigation of the number and kind of sensory elements which enter into animal consciousness at different levels. There is first a chapter on sensory discrimination in general, dealing with the problem as to what constitutes evidence for the presence of distinct sensory qualities. This is followed by chapters on the special senses: the chemical sense (including taste and smell), hearing, and vision. Later chapters deal with space-perception, modification of conscious processes by experience, and lastly attention. In the chapter on the criteria of sensory discrimination, the author argues that the fact that an animal responds in some way to a given stimulus, *e. g.*, sound waves, is not evidence that the animal consciously discriminates such a stimulus as qualitatively distinct. "It is not," she writes (p. 57) "the number of stimuli to which an animal reacts that can be taken as evidence of the qualitative variety of its sensations, but the number of stimuli to which it gives different reactions." Even this, however, we are told, is probably too simple a statement of the case. A given type of stimulus, *e. g.*, sound waves, may be perceived as qualitatively distinct even though it brings out no specific direct reaction. If it brings out distinctive modification of other reactions we give it a place among the sensation-qualities of the animal's experience.

Now while the language used is different, and while the problems set for investigation are differently formulated, the difference between the treatment given in this and the succeeding chapters, and a frankly behavioristic treatment is far less radical than one might suppose. To ask: "Does the white rat have color-sensations, and if so which ones?" is not practically different from asking: "Does the white rat specifically discriminate chromatic wave-lengths?" And the case is similar throughout the whole range of sensory discrimination. The actual concrete problems which the dualistic psycholo-

gist is interested in investigating are essentially the same problems which the behaviorist is led to study. What the dualist does in effect is *to add on* an interpretation which can be only characterized justly as "metaphysical." By this I mean that just in so far as the dualist claims to infer from the facts of behavior the existence of an inner order of being, related in an inscrutable manner to those facts, he is stepping outside the bounds of scientifically verifiable hypothesis and entering upon purely metaphysical speculation in the bad sense of the term. To the actual empirical investigation of animal psychology such an attempted interpretation adds no significance.

The "epiphenomenal" character of such interpretation comes out clearly in the treatment of various topics. Indeed the treatment of the criteria of the presence of consciousness itself is a case in point. In the early chapter on the *Evidence of Mind* the author argues that none of the proposed tests for the inference of mind from structure or behavior is conclusive. Her conclusion is that no evidence exists for either denying or affirming the presence of consciousness in animals below the very highest, and that "for all we know it may exist in simple forms until we reach the very lowest of living beings" (p. 37). Such a position is, it seems to me, inevitable so long as one conceives consciousness as a superadded thing related to behavior in a purely external way. For the presence or absence of such a metaphysical entity there can be no evidence. But, on the other hand, the hypothesis that such an entity is or is not present can make no difference in the scientific treatment of the concrete phenomena of animal psychology. Thus when the question is asked whether an animal discriminates the visual qualities "red" and "blue," the actual answer of the dualistic psychologist is no whit different from that of the behaviorist. "No evidence of discrimination between two stimuli on an animal's part," writes Professor Washburn (p. 53), "can do more than show us that for the animal they are different; just what the quality of the sensation resulting from each may be, whether it is identical with any sensation quality entering into our own experience, we can not say. The light rays which to us are red and blue may for an animal's consciousness also differ from each other, and yet if our experience could be exchanged for the animal's, we might find in the latter nothing like red or blue as we know them." The same might of course be said of the sensory discrimination of a fellow man, even though he were a trained introspectionist. To assert: "*A* experiences the sensation qualities red and blue," and "*A* has the capacity for discriminatory response to the corresponding wave-lengths," are not descriptions of two different facts, but merely different descriptions of one and the same fact. The belief of the dualist that there is really a difference be-

tween the two facts is a belief which, by Professor Washburn's own admission, could only be justified by an appeal to a supernatural insight. For the supposition that "if our experience could be exchanged for the animal's we might find in the latter nothing like red or blue as we know them," is essentially an appeal to a sort of knowledge which only a God might enjoy, or perhaps a mortal blessed with a magic power.

One might, if it were worth while, take up one after another the particular problems of sensory discrimination discussed by our author and show that the so-called psychological interpretation of the facts of behavior is either a pure piece of metaphysical speculation, or else merely such a classification of them as a behaviorist might make. The positive scientific conclusions reached in each case differ only in mode of formulation. Let one more instance suffice—the case of what is called by the dualist the "sense of hearing" in frogs and by the behaviorist the "auditory response" of frogs. The case has been of interest to investigators because frogs under experimental conditions have not given evidence of hearing, *i. e.*, specific response to noises. Frogs do, however, possess specialized auditory apparatus and in their native habitat appear to respond to the croaking of their fellows. Observation by Yerkes[3] revealed the apparent fact that they depend almost wholly upon visual stimuli for avoidance of danger. Upon experiment it was found that while no direct specific response was given to auditory stimuli, such stimulation had a specific indirect effect in modifying reaction to other stimuli, which was particularly marked during the mating season, and which ceased when the auditory nerve was cut. On this evidence the dualist decides that probably the frog does possess a sense of hearing or have "true auditory sensations," while the behaviorist is content to ascribe merely a capacity for "limited auditory response." But unless the dualist distinguishes his conclusion as one verifiable only by supernatural insight, he must be content to equate it with that of the behaviorist.

And yet in spite of what seems to me the fatal weakness of the dualist's position, his protest against the claims of *mechanistic* behaviorism must be granted a large justification. As against the claims of a Bethe or a Loeb, the dualism of Professor Washburn is indeed inevitable. And such a formulation as theirs of the behaviorist position is apparently the only alternative to dualism considered by our author. The behavior of animals, in her view as in the view of the mechanists, is adequately describable as a series of physico-chemical processes, so that if psychological science can not

[3] Cited by Professor Washburn, *op. cit.*, p. 130, and by Professor John B. Watson, *Behaviorism*, p. 387.

legitimately infer inner psychical states as the accompaniment of these processes, it must confine itself to the observation and measurement of these purely physical phenomena themselves.

Accordingly we find our author writing: "If a physiologist perfected an instrument by which he could observe the nervous process in my cortex that occurs when I am conscious of the sensation red, he would see nothing red about it; if he could watch the bodily movements that result from this stimulation, say, for instance, the slight contraction of the articulatory muscles that occurs when I say "red" to myself, he would not see them as red. *The red is in my consciousness, and no devices for observing and registering my movements will ever observe the red, though they may easily lead to the inference that it exists in my consciousness.* And precisely the same is true of all my sensations, thoughts, and feelings" (pp. 23–24; italics mine).

If certain behaviorists had not actually laid themselves open to the charge of identifying red with a form of nervous discharge, it would be incredible that such a doctrine should be deemed worthy of serious criticism. Need it be pointed out that not even mechanics confines itself to existents that can be observed? As well might a metaphysical physicist declare that since no observation of physical changes yielded a glimpse of energy, he must either deny its existence outright or else assign it to a transcendental realm. The behaviorist surely can claim the same theoretical advantages enjoyed by scientists in other fields. It is open to him to assert of the subject's red—as the physical chemist asserts of the electrical charge of the ion—that it is a function of directly observable phenomena; in this case, of discriminative responses to a set of standardized conditions. What the red may be "in itself" or for a supernatural insight with which he may imagine himself to be endowed, the psychologist has no more concern than the physicist. That such a theoretical formulation accords with the actual empirical procedure of psychology has already been argued.

What stands in the way of such a formulation is the status of introspection as a psychological method. The mechanistic behaviorist would either ignore it or consign it to the scrap-heap without further consideration; while for the dualist it is enshrined as the indispensable and sacred method of the true faith. But as a matter of fact the one rejects it and the other clings to it for the same reason. It is because both alike regard it as a sort of observation wholly different from the observation of objective phenomena engaged in by the behaviorist, an immediate vision of an inner world hidden from all but one. The mechanistic behaviorist is led by this preconception to deny the value of the empirical fruits of intro-

spection; the dualist, made confident by the attested value of the empirical fruits, entrenches himself the more obstinately in his theoretical conceptions.

But we may ask: May not behaviorism find a place for much of the empirical procedure which is labelled introspection; and may not one be convinced of the fruitfulness of introspective investigation without becoming a dualist? That is for me the critical question of psychological methodology.

GRACE A. DE LAGUNA.

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OTHER MEN'S MINDS

THE common unformulated notion that we have an intuitive knowledge of other men's minds persists in the conceptions of careful thinkers notwithstanding perfectly obvious objections to such a view.

For instance, we attribute consciousness not only to man, but also to some animals. Is this attribution based upon the same unassailable intuition? If it is, why is it that we are so uncertain in making this attribution? Why do we unhesitatingly agree that the dog and the horse have consciousness, but find it difficult to agree as to its existence, or non-existence, in connection with the life of the ant and of the bee? Is it not evident that in the case of the animal world we are dealing with modes of interpretation based upon data that are at times equivocal?

The data we employ in the case of animals is very evidently found in their behavior. Is it not clear that we also attribute minds to other men as the result of a similar interpretation? And if this is true, why should we assume that we have a very special intuitive knowledge, transcendent of experience, which leads us to attribute consciousness to other human beings than ourselves? Let us examine this subject in some detail.

In everyday life we are concerned with the consideration of what we, when we become sophisticated, call objects-in-the-outer-world. Changes in these objects under changed conditions we speak of as their behavior. The word behavior is, however, generally specially applied to changes in living animals, and especially in men-animals; and as the behavior of men-animals is most significant in our lives, it is more often noted than that of other animals.

Now each human individual realizes that he himself is a man-animal; and each of us observes his own behavior more constantly, and more carefully, than that of any other man-animal. With certain forms of this behavior of our own which are hesitant, and

deliberate as we say, we note what we call consciousness. With certain other forms, which are non-hesitant, as for instance what we call our reflex acts, we note no consciousness. This leads us to look upon consciousness as something that is in a way detached from, although closely related with, our behavior.

But we go beyond that. The two types of our own behavior just mentioned are, as we have said, noticeably different in form; they are appreciated as hesitant and non-hesitant, and this quite apart from the fact that the one type has, and the other has not, its consciousness accompaniment. In observing the behavior of other men-animals, we note activities of these same two types; but when we make such observation we find no consciousness accompaniment with either of them. The kind of behavior that is always conscious behavior when noticed in myself, is witnessed in my neighbor without any consciousness accompaniment whatever. Thus I observe myself running away from a sudden danger and feel fear: where the danger applies to my neighbor, but not to me, I observe his flight, as I observe my own, but I feel no fear.

Notwithstanding this obvious fact, we have no hesitation in assuming that the behavior of other men that is like that behavior of our own that has a consciousness accompaniment, has for them also a consciousness accompaniment, even though we ourselves do not appreciate it. I do not hesitate to say that my neighbor was afraid when he fled in a panic, although I observed nothing but his flight, and no fear at all.

Evidently we are dealing here with a pure assumption. We assume that certain forms of behavior, which in our own cases involve a consciousness accompaniment, involve the same consciousness accompaniment for other men who behave in the same way. And within certain very arbitrary limits we are accustomed to make the same assumption in regard to the behavior of other animals than men.

On what grounds do we make this assumption? The average man is likely to say, that our neighbor tells us that he has this consciousness accompaniment of the behavior we refer to. But evidently we make the assumption whether he tells us of it or not. We assume his fear when he flees even if he does not tell us of it, and would believe him to be lying if he denied having been afraid. Moreover we are quite as ready to ascribe fear to the dog that runs away from attack as we are to the fleeing man, and the dog can not tell us of his fear: we assume it because of his behavior.

This leads us to note that speech is itself a form of behavior, the nature of which is indicated to us, not through sight indeed, but

through an equally reliable sense, *viz.* that of hearing. Whether I see a man shake his head in dissent from what I am saying, or hear him say "No, no," I do not myself appreciate the conscious state which I describe as dissent; but in the one case as in the other I interpret the head movement behavior noted through the eye, and the throat movement noted through the ear. In both cases I make the same assumption that behavior which, when it occurs in me, is accompanied by a specific conscious state, is accompanied by a similar conscious state when it occurs in him.

Further evidence that we are here dealing altogether with an interpretation, based upon an assumption, is given in the fact that we not infrequently attribute to other men states of consciousness which they tell us they did not experience. We then are likely to say that we misinterpreted their gesture behavior, or the purport of their speech, in this acknowledging the fact of interpretation.

As we have seen, the "common man" generally holds, tacitly, that we have a mysterious intuitive knowledge of other men's minds, a knowledge that is transcendent of experience. And more careful thinkers find it difficult to abandon this view. Some call our attention to the fact that the clear appreciation by the adult of his own Self is bound up with his recognition of other Selves; and would thus lead us to infer that our knowledge of other minds is of the same type as our knowledge of our own. But in this they cloud the issue. The notion of my "Self" is a highly complex conception developed from simpler conscious experiences that are themselves differentiated from behavior. It is true that the clear notion of my own Self is that of an individual in a group, and that the other members of the group are appreciated to be other Selves; but that merely throws us back to our original question, *viz.*, how do we come to believe that other individual men have consciousnesses, and the Selves that develop therein. In the very beginning of social relations each individual must have found implicit in his experience the distinction between the observed behavior of his own body *with* its added consciousness attribute, and the observed like behavior of other men *without* this added consciousness attribute; and it is evident that if a process of interpretation is explicit when we think clearly of the behavior and of the consciousness of other men, it probably, to say the least, has been implicit from the very beginning. The problem is thus merely thrown back in time.

We are thus led to ask what basis we have, if any, for the assumption we are considering. It seems to me that we have a very firm one in the very nature of consciousness as it is divulged to us

as the result of our psychological studies. These have taught us that when two characteristics of a frequently observed object are separable they become so connected by association, as we call it, that when one of the characteristics is given in a new object, the other of the two characteristics of the frequently observed object is likely to be reinstated as an image, and is thus naturally looked upon as an attribute of the object later observed. Furthermore the characteristics of the more frequently observed one of the two objects are the ones that are most likely to be attributed to the less frequently observed, but similar, of the two objects. Thus, for example, we see a carefully shaded round piece of yellow paper, and at once think "how exactly it looks like an orange." But, were round shaded pieces of yellow paper more common in our experience than oranges, we should say, when we saw an orange, "how much it looks like a shaded round piece of yellow paper."

In the very earliest observations of babyhood, the behavior of the baby's own body and of other person's bodies will naturally group themselves together. The baby's own hand movement, for instance, and the hand movements of the mother and nurse will appear to the baby to be all of a kind. Now the baby's own behavior, say its hand movements, is more constantly brought to its attention than the like behavior, again say the hand movements, of mother and nurse. Presently it finds that in connection with its own frequently observed hand movements it notes a conscious attribute. Hence when the baby next notes the hand movements of mother or nurse, the consciousness characteristic, so often observed in connection with its own most familiar hand movements, is reinstated as an image, and is attached by mere association to the less often, and less closely observed, hand movements of mother or nurse.

The process thus described in terms of hand movements would apply to all of the growing child's observation of behavior; and thus from the very beginnings of its life there would be established the habit of interpretation of the behavior of other persons in terms of consciousness. Indeed this habit would naturally tend to extend itself to all behavior of outer world objects, and thus we often find the young child attributing a conscious life to inanimate objects, a manner of thought that persists to a wide extent in adult life among childlike savages. But the experience of life must soon lead the child to the discrimination of animate from inanimate objects; and as this experience is extended he must find the interpretation referred to so effective in relation to the animate, and so ineffective in relation to the inanimate, that he will soon come to limit his interpretations in the main to apply to animate life. And this

manner of thought will be fostered as the child grows older by his appreciation of the fact that his conduct based upon this mode of interpretation is found to yield practical, and desired, results.

It would thus appear that the attribution of a consciousness characteristic to other men, connected with their behavior, is not due to any knowledge that transcends experience, but is due to a quite natural interpretation of the part of that experience which relates to the behavior of others, in terms of the much more frequently observed part of that experience which relates to ourselves.

HENRY RUTGERS MARSHALL.

NEW YORK CITY.

CONSCIOUS BEHAVIOR

MANY references in recent issues of this JOURNAL give the impression that when the behaviorist denies that consciousness must be regarded as an independent entity, this is equivalent to relinquishing the study of part of the subject-matter of traditional psychology. Some philosophers and psychologists seem to regard the behaviorists as animal psychologists who have availed themselves of the expedient of simply ignoring what they do not understand and then regarding this high-handed brushing aside of difficult problems as equivalent to a solution of these problems. This conception so manifestly underlies Mr. H. R. Marshall's[1] objection to behaviorism that an attempt may not be inappropriate to indicate how the most baffling problems of human conduct may be investigated without utilizing the subjective methods of traditional psychology. The behaviorist merely maintains that the biological methods used in natural science can also be applied to those phenomena which have been designated as conscious or mental.

The immediate epistemological problem is to demonstrate that the concept of consciousness may be eliminated from the descriptions and explanations of human conduct and yet include *all* behavior, from the simplest types of animal behavior to the most complex human adjustments. The issue is clearly stated in Mr. Marshall's article. After differentiating animal behavior into the two types of reflex or instinctive on the one hand, and highly complex behavior that is hesitant, on the other, he continues: "The biologist studies both of these types of behavior in all forms of animal life; in the higher animals and in man, and in both cases quite objectively. . . .

"But the biological student is himself a man, and as he observes his own activities, still as part of the objective world, he discovers

[1] "Behavior." This JOURNAL, Vol. XV., No. 10, pp. 258–261.

in them these same two types of behavior. When in regard to his own body he studies that highly complex form of behavior that is hesitant and not immediate, he finds all that he discovers in connection with his studies of this type of behavior in other animals; but in very many cases *he discovers also something more.* He finds not only behavior of this special type but '*conscious* behavior.'

"In this observation of his own behavior the student then has not only the characteristics that yield the special sciences of neurology and biochemistry, for instance, but a quite different characteristic that yields the special science of the conscious; and this is what has always been designated as psychology."

Considered merely as a statement of fact it is not likely that any behaviorist denies anything contained in the preceding quotation. However, it is open for discussion whether the differentiation into *conscious* and (by implication) *unconscious* behavior can not be displaced by a classification and method of investigation having greater heuristic possibilities, without limiting the scope of the investigation.

What is the *something more* that the biologist finds when he observes his own activities?

All Subjective Phenomena is Expressed in Action.—At the outset it is necessary to agree that whatever the character of this something more may be, it must be expressed in some sort of a reaction; a written account, oral description, gesture, facial expression, pantomine or any other conventional form of representation.[2] Unless the something more is *expressed in action of some sort* it can not become the data of science or of empirical investigation. If it is maintained that consciousness is something more than a verbal report this something more must be activity of some form; changes in respiration, vaso-motor changes, glandular or visceral secretions, but since these changes are usually expressed in verbal descriptions we shall regard the speech reaction as furnishing adequate data for the discussion in this article.

To deny that consciousness must be expressed in order to be available for science places it beyond the reach of scientific investigation and within the realm of poetry or literature.

If it is granted that consciousness must be *expressed* as neuromuscular phenomena, the problem becomes that of determining the neural characteristics of those expressions or activities of which consciousness is predicated.

Delimitation of the Discussion.—To simplify the analysis of these characteristics we assume a concrete situation in which there is an

[2] In the interest of simplicity in presentation the single phrase "speech reaction" will be used to designate any of these forms of expression.

observer who has reported his own movements and also introspections on his "mental states or processes" in the accepted psychological manner. We shall refer to this individual as the *self observer.* In addition he is supposed to be under the observation of another person whom we shall call the *outside observer.* It is further supposed that each observer has prepared a report describing that phase of the concrete situation in which he participated. A comparison of the two reports should reveal the characteristics of what is traditionally known as conscious behavior, in so far as it is a part of our concrete situation.

Objective Behavior.—An inspection of the observers' reports reveals many reactions that are similar. For instance in the self observer's report is found, "My hand moved before my eyes," while in the outside observer's report is found, "His hand moved before his eyes." Both of these items represent coordinated contractions of the muscles used in writing. The light reflected from the hand of the self observer acts upon his own eyes and also upon those of the outside observer. A *single* stimulus source thus results in *two* sets of neural processes, each leading to independent but similar contractions of the muscles of the writing hand of each observer, in the coordinated manner which we describe as *writing,* the character of which (choice of words, grammatical structure, *etc.*) will depend upon what language habits have been acquired. All of this may be regarded as solely neural or biological in character. It is of no scientific advantage to claim that these speech reactions were accompanied by mental processes, since if no reactions had been made, no mental states could ever have been inferred. Objective behavior then can be regarded as that type of behavior in which the sensorimotor conditions are similar (not necessarily identical) for all those individuals who may be regarded as participating in the observation.

Sensory Subjective Behavior.—The self observer in addition to reporting, "My hand moved before my eyes," may also report, "I had kinesthetic sensations localized in the muscles of the forearm and shoulders; some kind of sensations which seemed to be localized in the eyes as I tried to follow the movement; strain sensations in the back and neck." The number of such observations, traditionally designated as subjective or introspective, depends largely upon the complexity of the reaction, its duration, and upon skill in discriminating obscure and weak stimuli.

Regarding these reactions as due to the stimulation of kinesthetic sense organs located in the self observer's arms, shoulder, back and eye muscles, it is clear that he has a source of stimulation not available to the outside observer from whom we should not expect a simi-

lar reaction since no corresponding sense organs in his own body are being stimulated.

Mr. Marshall supports his contention that consciousness must be regarded as a factor in behavior by referring to the practise of the physician, "who constantly treats of the conscious states of his patients as symptomatic of special forms of organic behavior." This only means that the patient may react to obscure stimuli within his own body which, of course, can not act upon the sense organs of the physician. In other words the physician's reactions are limited mainly to visual and auditory impressions while the patient may have additional organic, kinesthetic and cutaneous impressions which do not act upon the physician's sensorium.

The reason the physician asks the patient to react to the obscure and personal stimuli is because no better way of making the diagnosis is available. Where it is possible to substitute the physician's sense organs for those of the patient it is invariably done. To illustrate: The dentist has two ways of determining whether the root of a tooth is abscessed; (1) by tapping it in various ways, pressing on the gums and asking the patient how it "feels." The "feeling" of the patient is of course due to the stimulation of the various pain and tactual sense organs which are stimulated by the tapping or pressing. This is the subjective method of diagnosis. The other method, (2) is to take an X-ray photograph of the teeth and gums. In this method the dentist substitutes his own sense organs (vision) for the pain and tactual receptors of the patient. In doubtful cases both methods are used, but where the two methods give contradictory results it is the X-ray which is regarded as authoritative, not the subjective states of the patient.

It must be remembered that the terms subjective and objective are *social* distinctions. A single individual's reactions are all of one sort. Either all subjective, or all objective, or neither, depending upon what metaphysical point of view is taken. From the anatomical and physiological standpoints this distinction only designates the empirical fact that we may react to stimuli arising within our own bodies or to stimuli arising outside of the body. Those stimuli arising within our own bodies do not act on corresponding sense organs in *other persons,* whereas the stimuli arising outside the body may act on corresponding sense organs in any number of individuals. It is to be expected that these marked differences in stimulus conditions will result in marked differences in the reactions. Subjective and objective then, from the biological standpoint are merely terms that indirectly designate this difference in the termini of our reaction mechanisms.

Imaginal Subjective Behavior.—In addition to reacting to sensory stimulations within his own body the self observer may also report what is known as imagery, affective states, cognitive conditions, *etc.*, as for instance, "The movement of my hand reminds me of a semaphore action which I saw in a railway station at the end of an unpleasant trip." The immediate sensory factors in this type of observation are relatively insignificant as compared with the central neural interconnections and the extent to which the nervous system has been modified by past function. The outside observer's report may also show this effect as when he reports, "The movement of the arm was made in a very characteristic fashion; my grandfather frequently made such a movement when brushing a fly from his nose; I wonder why I happened to think of it at this time?" The two reports do not agree because the neural processes pass over two different nervous systems each one of which has been independently modified by earlier function.

When neural processes which do not correspond in their sensorimotor configuration for both observers, are strong enough to result in motor contradictions such as those assumed in this particular situation, we may speak of introspection, the characteristic of which is the use in a professional manner of such terms as, sensations, images, affections, cognition, perception, memory, *etc.*, in our speech reactions. These terms may be used to describe our actions in a very consistent manner without referring at all to neurology so long as we wish merely to classify the reactions. When however we wish to determine the genesis of a particular mode of behavior, we are obliged to study the antecedent neural conditions.

Imaginal Subjective Incipient Behavior.—In our illustration we have assumed that the observers have actually reacted (written out their imagery). This assumes that the neural processes which get their present configuration from previous functioning are strong enough to result in the motor contractions necessary to write out a report. We should expect that frequently such processes are not strong enough to result in reactions which can be detected and inspected by an outside observer, but from other observations it has been found that actions very often do result, especially when we consider subvocal reactions.

This type of neural activity may be designated as *thinking* and in this sense thinking is only neuro-muscular activity which gets its character from past neural function but at the moment is not strong enough to result in speech reactions. It may become strong enough at any moment, as when an observer begins to "talk to himself" or "thinks out loud." The sense organs that are stimulated may be

obscure kinesthetic or organic receptors in the body of the self observer, or a part of the neural flux directly involved in the overt reaction of the moment, may take its course to those motor points which actually did contract at some previous time.

When reacting to any situation the spread of the neural flux over the nervous system is always wider than necessary to react in a socially adequate manner. Supplementary speech reactions, respiratory and vaso-motor changes of no significance for the social adequacy of a reaction may and usually do occur. Under ordinary conditions we ignore them because the character of these supplementary reactions varies so much from individual to individual and for the same individual at different times that uniformity can scarcely be said to exist.

The spontaneous or conscious character of our thought processes is an illusion due to the fact that the actual neural conditions involved are obscure and can not be definitely referred to the immediate sensori-motor conditions.

Conscious Behavior.—The term *conscious* characterising actions is regarded by the behaviorist as merely a vague and ambiguous expression referring to undefined combinations of objective, sensory subjective, imaginal subjective, and imaginal subjective incipient behavior.[3] In another article[4] the writer has attempted to give the term a definite meaning by restricting its use to those observations in which the terminology of traditional psychology is used in a descriptive sense.

The behaviorist regards all behavior as neuro-muscular action whether these actions are the ones by which bodily adjustments are made or whether they consist of the complex speech reactions whose final result is the statement of a natural law or the publication of a treatise on metaphysics. The problem of consciousness for the behaviorists is merely that of agreeing among themselves as to what types of action it will be most convenient to designate by this term. So far they have agreed that the most convenient thing is not to use the term at all. If those who insist upon the heuristic value of subjective descriptions or upon the existential character of consciousness aside from its neuro-muscular expressions will indicate clearly what *they* mean by the term consciousness, perhaps the behaviorist will

[3] This classification is to be regarded as representing a transition stage between the terminology of traditional psychology and that of behaviorism. It has value only as a concise abbreviation of the subject-matter discussed in this article. The writer is aware that its dualistic character will not make it acceptable either for traditional psychologists or for the behaviorists.

[4] "Relation between Functional and Behavior Psychology," *Psychol. Rev.*, Vol. XXV., September, 1917, pp. 360–366.

then be able to place it somewhere within his own categories. It is very certain, however, that defining consciousness as the *something more* that accompanies certain types of action is hardly enough to begin negotiations.

Critics of behaviorism do not recognize clearly enough that the term consciousness varies in its meaning with almost every person who uses it. There is no generally accepted definition or description, and the fact that psychologists and philosophers have been unable to reach an agreement is one of the conditions which precipitated behaviorism. All human conduct, aspirations, hopes and endeavors, express themselves in actions of some kind or other. Whatever the specific character of these actions may be they can not exceed the limits set by (1) the type of nervous system that has been inherited; (2) the way in which past neural function has modified it; and (3) the character of the stimuli which are immediately effective. Since these factors are never the same for any two individuals it may be useful to designate those reactions which express this difference as consciousness or mentality. However, it is the traditional psychologist who should formulate the problem of consciousness or mentality—not the behaviorist. The success of behavior methods will not depend on how they react to the problem of consciousness; they succeed or fail according as they do or do not further the general welfare of society.

Epistemologically the behaviorist supports the monistic principle that all phenomena can be reduced to action. He regards the interpolation of some hypothetical conscious principles as unnecessary.

The Illusory Spontaneity of the Speech Reaction.—Much confusion arises because the speech reaction is regarded as falling outside the laws of neuro-muscular activity that govern bodily movements (arms, legs, head, *etc.*). Speech is regarded as something spontaneous, that while we may recognize bodily reactions as neuro-muscular in character our speech is free; we can say what we choose, argue either for or against a proposition if we wish, or remain silent when this suits our fancy. The behaviorist regards speech just as much a neuro-muscular adaptation to an environment and just as inevitable as the withdrawal of the finger from a hot stove. The significant thing about the speech reaction is that it may be either the adequate *reaction* to a situation, or it may be the adequate *stimulus* for either another speech reaction or some bodily reaction.[5] Speech may thus function either as a stimulus or as a reaction.

Another reason for differentiating speech from other forms of ac-

[5] This dual character of the speech mechanism has been developed by Max. F. Meyer, *Fundamental Laws of Human Behavior*, 1911, pp. 211–226.

tivity is that its protective or nutritive function is indirect. The word "potato" does not have the food value of the real potato, nor will the mere pronunciation of the words, "Look out" prevent the falling brick from striking the pedestrian. Furthermore, the process of learning to make the proper speech reactions in our professional and social activities covers such a long period of time that the neural conditions involved in the learning are gradually changing. This tends to obscure the source of our speech reactions and as a consequence we do not think of them as sensori-motor adjustments to our environment of the same general type as those actions which contribute more obviously toward nutrition or protection.

Illustration of the Social Significance of the Speech Reactions.[6]— It is usually maintained that the high cost of living is due to the war. In investigating the situation it was found that the population of the United States during the ten years preceding the war increased twenty per cent., while food production increased only ten per cent. As a result of this investigation the following verbal statement was formulated: "The high cost of food is not entirely due to the war but is partly due to the fact that the population is increasing more rapidly than the food supply." This statement may be regarded as the adequate speech *reaction* of the investigator to the visual stimuli of certain records and statistics acting on his nervous system which has been variously and specifically modified by past stimulation and function. To determine just how all these factors interact to produce the speech reaction which is quoted is of course a difficult task, but a strictly empirical one, the analysis of which must consider the inheritance, training and life conditions of the investigator.

The reaction, however, may also be regarded as a *stimulus* which, acting on the eyes of some responsible person in the Department of Agriculture, leads to another speech reaction in the form of verbal orders from the Department to the various experiment stations and field representatives, requesting that every energy be expended to increase food production at least ten per cent. Suppose that all this comes to pass and that we have an actual increase in the food supply and a reduction in the cost of food. We can then say that the original speech reaction is very valuable and that it should be conserved for future needs. It may then become incorporated in our text-books of sociology and agriculture. The value of this particular speech reaction lies solely in the fact that it may be used as a stimulus under the proper conditions, and when so used the ultimate result is an increased food supply.

[6] The illustration here used is not original with the writer. It has, however, been so "manifestly adapted" to the present needs that it is difficult to assign proper credit.

Such a speech reaction is usually called a law, theory, hypothesis, working plan, and by reason of the fact that it is an effective stimulus to produce socially valuable actions on the part of individuals or communities it is incorporated in some phase of our educational system. The formulation of the original speech reaction is, however, a neuro-muscular phenomenon of the vocal mechanism or writing hand just as much as the more obvious skilled activity of designing or perfecting scientific apparatus.

To say that the speech reaction is the result of reasoning, logic, imagination, is merely to classify it according to properties which were at one time regarded as independent entities (faculty of reasoning, intelligence, imagination). As the scientific inadequacy of the faculty concept was demonstrated the number of faculties decreased until now they are supposed to have disappeared. The classifications, however, still remain and of course may still be used to classify our reactions, but it must be remembered that the original justification for their development (the faculty concept) no longer exists. The types of classification used in successful scientific practise to-day are those in which the principles of evolution, phylogeny, and ontogeny are predominant. Faculties or entities do not have an evolutionary, phylogenetic or ontogenic history and this fact immediately places them beyond the methods of natural science. At any rate the classification of our reactions according to the methods of traditional psychology leaves us in ignorance of the antecedent neural or biological conditions necessary to formulate other or still more valuable speech reactions.

To ask the investigator who formulated the valuable law which is quoted, to introspect on the conscious states which seemed to him to have some relation to the law, merely brings out how he might have reacted in addition to formulating the law. That is, in addition to reacting to a complex statistical situation by forming the statement, "To maintain existing economic and social conditions, the ratio between the percentage increase in population and the percentage increase in food supply must approach unity," the investigator might also have reacted by saying, "I have a visual image of a sheaf of wheat; an auditory image of the words, ten over ten equals one; a visual image of twelve people standing around a table upon which only eleven places are laid; many kinesthetic and organic sensations; fragmentary imagery of the syllogism, 'All men are mortal, Socrates is a man, Socrates is mortal.'" These supplementary speech reactions tell us something no doubt, but the essential conditions leading to the formulation of a valuable speech reaction are so much a matter of inheritance and training, are so much a function of the whole life

history of the individual, that the few supplementary reactions which can be induced on the occasion of its occurrence, interfere with its formulation rather than throw light upon its origin.

The behaviorist maintains that since a valuable scientific law, discovery or invention is sensori-motor phenomena, better laws, greater discoveries may be expected from the study of the biological evolution of the sensori-motor phenomena than from a study of the supplementary phenomena occurring with it.

Summary

The behaviorists maintain that the natural science methods used in biology are also adequate to investigate the phenomena that traditional psychology designates as conscious or subjective.

If subjective phenomena is to be investigated it must be expressed in neuro-muscular functions of some kind. To maintain that consciousness is something more than neuro-muscular phenomena can not be demonstrated and hence is beyond the technique of current scientific methods.

Objective behavior is that type of behavior in which the neural conditions are such that the same stimulus source acts upon corresponding sense organs for all the individuals participating in the observation. Similarity in the reactions is the test of objective behavior.

Sensory subjective behavior is that type of behavior in which the self observer is reacting to a source of stimulation (usually organic or kinesthetic) located in his own body and which stimuli can not act on corresponding sense organs in the body of the outside observer.

Imaginal subjective behavior expresses the effect of neural modifications which are due to previous functioning of the nervous system.

Imaginal subjective incipient behavior (thinking) derives its character from previous neural functioning, but at the moment under consideration the neural flux is not strong enough to result in speech reactions.

Conscious behavior may be used as a term to designate the differences between the reactions of individuals. In the absence of any considerable uniformity among traditional psychologists as to the meaning of the term consciousness, the behaviorist is justified in delaying its inclusion into his own categories until a greater degree of agreement has been established.

Much of the objection to behaviorism is due to the implicit assumption that speech reactions are spontaneous activities, instead of neuro-muscular adjustments indirectly contributing to individ-

ual survival in the same manner as nutritive or protective reactions.

The speech reactions which are valuable for society are those which may function as effective stimuli in the further development of the physical and social resources of the community.

Since speech reactions may be regarded as sensori-motor phenomena, the direct study of their antecedent neural and general biological conditions is of greater scientific advantage than the study of concomitant or supplementary (conscious) phenomena giving only fragmentary and highly variable indices of the essential antecedents.

The traditional psychological classifications still convey at least an implicit faculty reference to many psychologists and philosophers. So difficult is it to disregard this assumption and the "specially created" attitude toward complex human behavior, that some psychologists (the behaviorists) prefer to substitute natural science concepts in which the principles of evolution, phylogeny and ontogeny are explicitly regarded as underlying their investigations.

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REVIEWS AND ABSTRACTS OF LITERATURE

The Picture Completion Test. RUDOLF PINTNER and MARGARET M. ANDERSON. Baltimore: Warwick and York. 1917. Pp. 101.

In this monograph the authors present a standardization of Healy's Pictorial Completion Test, which was introduced in the *Psychological Review* in 1914. Since that date the test has become familiar in psychological clinics. It was devised with the intention of making available a test which would involve the Ebbinghaus Completion Method, and would at the same time eliminate the factor of language. It consists of a picture, significant missing elements of which are to be supplied by choice among many alternatives provided.

Hitherto the test could be given only for the purpose of gaining a general idea of the subject's mentality, and, as is the case with all unstandardized or partially standardized tests, the results were of problematical value. The authors of the present work have thus made a very useful contribution to the equipment of the psychological clinic, by determining and presenting norms of performance for every age, from five years to adult years, inclusive. In the absence of any statement to the contrary, it is probably permissible to assume that age is counted from birthday to birthday, a five-year-old, for example, being counted as five years old from his fifth birthday to

his sixth birthday, instead of being counted as five years old during the twelve months nearest to his fifth birthday, as is sometimes done in standardization. A definite statement from the authors would have served to clarify this doubtful point.

The medians and percentiles, in terms of which the norms are calculated, are based on a total of fifteen hundred and twenty cases, but the number of subjects at age five is very small. As in all standardizations which are of value, the point of view is behavioristic throughout, no *a priori* judgments being made by the investigators as to which moves should be considered correct, and which incorrect. The performance is finally scored in terms of the kinds of moves made, the factor of time being neglected. As a result of the research, the psychologist is provided with norms which may be used as a year scale, a point scale, or a percentile scale.

The authors are able to report that this test is excellently adapted for children at all ages, and to some extent for adults; that there are no sex differences in performance; that, as would be expected from previously published results of general intelligence tests, children from good or medium environment are better performers than are children from poor environment; and that accelerated pupils do better than retarded pupils. All of these results tend to give confidence in the validity of the test. The correlation of the performance at each age with that at every other age shows the relative difficulty of the various moves to be approximately the same for children of all ages.

It is desirable that many more tests may be thus adequately standardized in the near future. Psychologists have been diligent in devising tests, rather than in standardizing them. The clinician, however, calls not for ingenious and interesting devices, but for instruments of precision. It is to be hoped that Professor Pintner and his collaborators may continue to add to their already extensive service in this field.

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JOURNALS AND NEW BOOKS

JOURNAL OF EDUCATIONAL PSYCHOLOGY. January 1918. *Some Mathematical Aspects of the Binet-Simon Tests* (pp. 1–12): FRANCIS N. MAXFIELD. – The result of the child's performance is the score and it must be interpreted. An analysis of the results of several workers is given and a list of references appended. *The Measurement of Intelligence: Six Hundred and Fifty-three Children Examined by the Binet and Porteus Tests* (pp. 13–31): S. D. PORTEUS.

– Several conclusions are drawn from the results with normal and feeble-minded children. The relation between the two tests is fairly constant: about 70 per cent. test within one year of the Binet age. *Freshman Tests at the State University of Iowa* (pp. 32–46): IRVING KING and JAMES MCCRORY. – Two hundred and seventy-six women and 268 men in the university were tested freshmen year. Eight tests were used and they show fairly good correlation with academic work the first semester. The median performances of the boys slightly excels that of the girls in six of the eight tests. Sex differences in mental functionings are negligible as far as these mental tests are concerned. *Editorial. Notes and News. Publications received.*

Loeb, Jacques. Forced Movements, Tropisms, and Animal Conduct. Philadelphia and London: J. B. Lippincott Company. 1918. Pp. 209. $2.50.

Proceedings of the Aristotelian Society. New Series, Vol. XVIII. London: Williams and Norgate. 1918. Pp. iv + 655. 20s. net.

NOTES AND NEWS

THE following is the preliminary announcement of the plan for this year's meeting of the American Philosophical Association:

"The eighteenth annual meeting of the American Philosophical Association will be held at Cambridge, Mass., on December 27 and 28, in acceptance of the invitation of the president and of the department of philosophy of Harvard University. The sessions will begin on Friday morning and will continue through Saturday afternoon.

"In order that there may be a full attendance at the first session of the meeting, it is suggested that members plan to arrive on Thursday in time for informal meeting in the evening.

"In accordance with the plan adopted at the last meeting of the association, the executive committee has chosen for the main topic of this year's meeting the subject "Vitalism and Mechanism," and has appointed as the leader of the discussion Professor R. F. A. Hoernlé, of Harvard University, who in turn has chosen Professors L. J. Henderson, of Harvard University, H. S. Jennings, of Johns Hopkins University, W. T. Marvin, of Rutgers College, and H. C. Warren, of Princeton University. Abstracts of the leaders' papers will be found in the JOURNAL OF PHILOSOPHY, PSYCHOLOGY AND SCIENTIFIC METHODS, Vol. XV., No. 17 (August 15, 1918), and a bibliography of the topic in the same JOURNAL, Vol. XV., No. 20 (September 26, 1918). The full papers will be found in the forthcoming (November) number of *The Philosophical Review.*

"Members of the association are invited to contribute papers to the discussion. There will also be an opportunity, through two or more sessions, for the presentation of papers on other problems of philosophical interest. Papers will be limited to twenty minutes, unless extended by special arrangement. Members are requested to send to the Acting Secretary, not later than November 15, the titles, and, if possible, the abstracts, of papers they propose to read. The final program will be sent out early in December. Abstracts for publication in the *Proceedings* are limited to four hundred words, and must be in the hands of the Acting Secretary by December 28.

"The Executive Committee is directed to invite members of the association to suggest topics for the meeting of 1919. Such topics should be sent to the Acting Secretary as soon as possible, in order that careful consideration may be given to plans for the ensuing year.

"Membership blanks will be furnished on request, and should be so filled out as to give full information regarding the candidates' qualifications. It is requested that nominations for membership be made as early as possible, and not later, in any case, than December 1.

"Radcliffe College has kindly placed at the disposal of the ladies of the association one of its dormitories, where lodging and breakfast may be had for $1.50 per day. Gentlemen will be accommodated, as far as possible, at the Colonial Club, Cambridge, and at the Harvard Club, Boston. The rates for rooms at the Colonial Club will be $2.00, and at the Harvard Club, $2.50 and $3.00 per day. The headquarters of the association will be Emerson Hall, and the Colonial Club near by. All requests for reservations should be addressed to Professor R. F. A. Hoernlé, Emerson Hall, Harvard University, Cambridge, and should reach him not later than December 10.

"In view of the unusual care expended this year upon the discussion program, and in view of the fact that several of the speakers are guests of the association, it is warmly urged that members make a special effort to attend, and to make the meeting as fruitful as possible of results. (Signed) E. C. WILM,

Acting Secretary."

688 BOYLSTON STREET,
BOSTON, MASS.,
October 15, 1918.

M. DE WULF, author of the excellent history of medieval philosophy, announces in the *Revue de Metaphysique et de Morale* (May–June) that he will publish a work in one volume to be called *Civilization et Philosophie au moyen age,* which will supplement the work on medieval philosophy. The substance of the new volume is the material of a course given at the University of Poitiers, and of which the introductory address is printed in the above mentioned number of the *Revue.*

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Sixteen Logical Aphorisms. DAVID F. SWENSON.

Societies: Eighteenth Annual Meeting of the Western Philosophical Association. EDWARD L. SCHAUB.

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